

**REMARKS**

Claims 1-10 are pending in the application. Claims 1-10 are rejected under 35 U.S.C. § 103(a).

Claims 1 and 6 have been amended to recite that the free space (16) now has a thickness great enough to allow said passage without causing an additional pressure drop. Support for this amendment can be found, for example, at page 5, lines 14-18 and page 10, lines 13-15, of the specification.

**Response to the Rejection of Claims 1-10 under 35 U.S.C. § 103**

Claims 1-10 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,202,097 to Poussin ("Poussin").

Applicants respectfully submit, however, that the presently claimed invention is not rendered obvious by the teachings of Poussin.

The present invention is directed to a method for revamping a radial reactor and addresses the problems associated with incomplete filling of a catalyst bed. Specifically, the invention prevents the reactants from bypassing the catalyst by covering the part of a perforated gas outlet wall that extends above the catalyst. This feature allows for the perforations of the gas outlet wall to be maintained. Thus, the perforations are able to effectively remove reactant and maintain the flow characteristics (*e.g.*, pressure drop) of the retrofitted reactor so that the characteristics would be identical to those of a completely filled catalytic bed (*see also*, page 9, lines 21-34, and page 10, lines 13-15, of the specification).

In addressing the problems associated with incomplete filling of a catalyst bed, an unperforated cylindrical wall is extended into a catalyst mass, and the gas reactant (or gaseous

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charge) is prevented from reaching the perforated gas outlet wall (or stack) without first passing through at least a part of the catalyst mass. In other words, in the present invention, it is the catalyst itself that performs the scaling action that prevents undesired bypass.

Applicants respectfully submit that Poussin does not address the problem of reactants bypassing the catalyst. Thus, one of ordinary skill in the art would not have been motivated to modify the reactor of Poussin and have arrived at the present invention. As evidence of this lack of motivation, Applicants submit that Poussin fails to mention the problems associated with pressure drop. Furthermore, Poussin fails to teach a reactor wherein a free-space between the unperforated cylindrical wall and the gas outlet wall that enables the reactant to flow without causing an additional pressure drop.

Thus, it is asserted that the presently claimed method is not *prima facie* obvious because one of ordinary skill in the art would not have been motivated to incorporate a free space of sufficient thickness to allow the passage of reactant without an additional pressure drop.

Applicants additionally submit that Poussin also fails to teach or suggest all of the elements of the claimed invention.

In Poussin, the central stack 9 is perforated only at the central portion which faces the annular catalytic compartment 8. *See* Figure 1 of Poussin. As illustrated in Figures 2, 4-6, and 8 of Poussin, no openings are present at the upper and lower end of the stack. Furthermore, Poussin does not disclose that the stack is perforated along all its length. Also, Poussin does not suggest any reason for having this type of peripheral openings on the stack.

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Applicants submit that any assertion that one of ordinary skill in the art would have modified the stack of Poussin in this manner would be improperly based on hindsight reasoning since Poussin does not provide the motivation to do so.

With respect to the presently recited "free space," Applicants submit that Poussin fails to teach such a feature as demonstrated by the lack thereof between the central stack 9 and the metal cap 10. Applicants further submit that the apparent separation between these two elements shown in some Figures (*i.e.*, Figures 1, 4, 6) is due solely to graphic reasons. Applicants assert that one of ordinary skill in the art would not have found these figures, or the reference as a whole, to teach the presently recited free space. Applicants assert that this is evidenced by the lack of a free space in Figures 5, 7, 10 and 11.

Applicants note that Poussin also fails to teach a free space. In fact, such a free space is clearly and unambiguously excluded from the description of the invention. For example, at column 7, lines 19-22, Poussin teaches that the metal cap 10 seals the stack with respect to the charge (*i.e.*, the gaseous reactant (*see* column 7, lines 7, 10-12)). Thus, if the cap seals the stack from the gas reactant, the gas reactant cannot contact the portion of the stack closed by the cup, and no free-space between the cap and the stack can be present.

Applicants further note that Poussin fails to teach or suggest the feature of a grid 30 that extends between the cap and the stack. Applicants submit that the function of this type of grid, which is generally less than 1 mm thick, is to prevent catalyst particles from penetrating the stack perforations. Thus, since Poussin teaches that the perforations are only present on the portion of the stack facing the catalyst, one of ordinary skill in the art would find no reason to provide the grid 30 between the cap and the stack as well. Moreover, it is asserted that the presence of such

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a grid between these two elements is undesirable according to Poussin, since it may cause difficulties in maintaining the seal (*see* column 7, lines 19-22).

It is asserted that even if a gap between the cap and the stack were present due to the grid 30, such a gap would be so thin that it would inevitably cause a pressure drop of the gas passing through it. Thus, one of ordinary skill in the art would not have found such a feature to be suggested by Poussin.

Applicants additionally note that Poussin teaches that no portion of the metal cap 10 remains below the upper level of the catalyst once the catalyst is loaded in the catalytic bed 7. Poussin teaches that the catalyst 31 is confined in the annular catalytic compartments 8, which are indicated in Figure 8 by oblique lines. The catalyst 31 is covered on top by a flexible layer 19 of inert material which can be in turn covered by a layer of inert balls 11, 12, 13 (*see, e.g.*, column 2, lines 31-33, 35-37, 52-56). It is noted that both the catalyst mass and the layer of inert balls are contained within a catalyst bed that is externally defined by a cylindrical wall which ends at the top of the upper wall 32.

Applicants note that the feature of Poussin wherein the metal cap 10 is immersed in the catalyst bed does is different from the feature of the present invention wherein the cap is immersed in the catalyst mass. For example, a catalyst bed might only fill a portion of the bed. Therefore, even though the cap can extend into the bed it does not mean that it also extends into the catalyst mass.

Also, it is submitted that the layer of inert balls 11, 12, 13 in which the cap is immersed is completely different from the catalyst particles of the present invention.

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Since Poussin fails to teach all of the elements of the claimed invention, Applicants respectfully request that the rejection of Claims 1-10 be reconsidered and withdrawn.

Applicants also submit that Poussin actually teaches away from the present invention. In the reactor of Poussin, the stack is sealed with respect to the gas reactant (*i.e.*, charge). If present in the present invention, however, such a seal would contribute to additional pressure drop. *See* pages 9 lines 28-34, and page 10, lines 13-15.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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